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ABSTRACT

In January 1985, the Coordinating Board of the Texas College and University System adopted rules and regulations to cover the offering of televised instruction by public institutions of higher education. An executive summary explains the rationale of this report, provides the major findings of a literature review, and compares data on enrollments and grade distributions in courses offered via television and in equivalent on-campus classes from institutions offering televised instruction. Part 1 reviews existing published and unpublished research, evaluation reports, and other materials relevant to the effectiveness of televised instruction, and provides a synopsis of first year activities of Texas' institutions operating under the new rules and regulations. Part 2 describes staff procedures for implementing the rules and regulations, provides a report on a survey of institutions that have received Board authority to offer televised instruction, and presents nine charts depicting enrollments at each institution, as well as grade distributions, comparisons of mean distributions, number of courses offered via interactive delivery systems, the number of receive sites in use by institution, and the percentage of receive site use by institution. The appendices include descriptions of the methodologies used for the literature review and the survey, a chronological listing of evaluation and research reports, and criteria for plan approval. An eight-page list of references is included. (DJR)

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INSTRUCTIONAL TELEVISION: A RESEARCH REVIEW AND STATUS REPORT

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Prepared for the Coordinating Board,
Texas College and University System

by

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Division of Universities and Research
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July, 1986

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EXECUTIVE SUMMARY

In January, 1985, the Coordinating Board, Texas College and University System, adopted rules and regulations to cover the offering of televised instruction by public institutions of higher education. The Board directed the staff to provide research evidence on the educational effectiveness of televised instruction and to report on first-year activities of institutions which had received Board authorization to offer courses via television. This report is a response to these two directives.

The staff reviewed more than 100 published and unpublished documents bearing on the effectiveness of televised instruction. Literature on both pre-produced telecourses and live, interactive televised instruction was examined. The following major findings emerged from the review of literature:

1. Comparative studies indicate that students taking courses via television achieve, in most cases, as well as students taking courses via traditional methods.
2. Findings of equivalent student achievement hold even when rigorous methodological research standards are applied.
3. Television is a technological device for transmitting communication and has no intrinsic effect, for good or ill, on student achievement.
4. Effective instructional design and techniques are the crucial elements in student achievement whether instruction is delivered by television or by traditional means.

5. Recent trends in research are directed toward identifying how best to use the unique capabilities of television to improve education.
6. National producers of telecourses employ procedures designed to create academically acceptable products which will withstand the critical scrutiny of scholars. Academicians are involved throughout the development, production, and evaluation processes.
7. The Annenberg/CPB Project selects proposed telecourses for funding through a peer review process. The courses are subjected to rigorous, continuous formative evaluation by academicians throughout production.

Each institutional application for Board authority to offer televised instruction undergoes stringent review by the staff and the Advisory Committee on Telecommunications and must meet established criteria to warrant a recommendation for approval. Eleven community/junior colleges or systems and four universities have received authorization to offer televised instruction during 1985-86. The staff obtained data from these institutions on enrollments and grade distributions in courses offered via television and in equivalent on-campus classes. Analysis of these data produced the following findings:

1. One hundred thirty-one telecourses were offered in 1985-86 by the community/junior colleges to a total enrollment of 18,996 students.
2. Mean percentage grade distributions are comparable for telecourse students and for students in equivalent on-campus

courses in grade categories A through F.

3. Percentage withdrawal rates for telecourse students are higher; however, in actual numbers, almost four times as many students withdrew from compared on-campus classes as withdrew from telecourses.
4. High attrition rates in community/junior college telecourses may result partially from open admission policies designed to provide educational opportunity to the questionably qualified.
5. Four universities offered a total of 82 courses via live, interactive delivery systems to 889 students in 1985-86.
6. Students took interactive instruction at a total of 44 different receive sites.
7. At the one university with sufficient enrollments for meaningful comparisons, mean percentage grade distributions in televised and concurrent on-campus classes were equivalent in all grade categories, with television students showing higher percentages in the A and B grade categories.
8. Attrition rates in live, interactive televised classes are almost identical to those in on-campus classes taught concurrently and neither rate is excessively high.

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INSTRUCTIONAL TELEVISION: A RESEARCH REVIEW AND STATUS REPORT

Introduction

In January, 1985, the Coordinating Board, Texas College and University System adopted Subchapter J of Chapter 5, Rules and Regulations; Programs Development. Subchapter J requires Board authorization for any public institution to offer televised instruction for state funding and imposes specific standards designed to ensure quality. At the time of adoption, the Board directed the staff to provide a report on the status of instructional television in the state at the end of the first academic year under the new rules. Subsequently, the Board directed the staff to provide research evidence relative to the question of the educational effectiveness of televised instruction. This report is in response to these two directives.

The report is divided into two parts. Part One reviews existing published and unpublished research and evaluation reports and other materials relevant to the question of educational effectiveness. It also touches briefly on other issues addressed in the literature. Part Two describes staff procedures employed in implementing the provisions of Subchapter J and reports information on enrollments and grade distributions supplied by institutions which have received Board authority to offer televised instruction.

PART ONE: REVIEW OF LITERATURE

Television is not a new technology and its use for instructional purposes is not a new phenomenon. This section highlights major historical developments in the use of television to provide educational services.

Historical Background: The Context

On January 25, 1933, the State University of Iowa, Iowa City, aired the first instructional telecast. Elementary and secondary schools began using broadcast television for instructional purposes in the 1940's and by 1948 at least eight colleges and universities were producing and using instructional television (Wood and Wylie, 1977).

The first commercial telecast originated in Detroit, Michigan, in February, 1940. Following World War II, use of television for commercial purposes unexpectedly exploded, and it appeared that all VHF and UHF channels would be snapped up by commercial interests. Pressure from professional educational television associations, however, forced the FCC to freeze television station construction in 1948 and reconsider channel allocations. As a result, 80 VHF and 162 UHF channels were set aside for noncommercial purposes (Wood and Wylie, 1977; Purdy, 1983).

In 1953 the first educational television station in the nation, KUHT, licensed to the University of Houston, went on the air. Within ten years there were almost a hundred (Wood and Wylie, 1977). In 1962, the Congress of the United States dedicated a specified frequency spectrum for instructional purposes. This spectrum area, the Instructional Television Fixed Service (ITFS), was first used by the Plainedge Public School System on Long Island (Curtis and Blatecky, 1977).

Following publication of the Carnegie Commission Report, Public Trust: The Report of the Carnegie Commission on Public Broadcasting in 1967, the federally funded Corporation for Public Broadcasting was created to oversee all of noncommercial broadcasting. Liberal grant

funding from the Ford Foundation is credited with making the PBS network of educational television stations a reality (Purdy, 1983; Curtis and Blatecky, 1977; Wood and Wylie, 1977).

Commercial networks experimented with instructional television in the early years. NBC's "Continental Classroom" survived five years and CBS's "Sunrise Semester" aired a surprising seventeen years (Naylor, 1984). Martin-Vegue, et al., note that the teaching environment during the first twenty years of instructional television tended to "turn off" university instructors. "They [were] subjected to TV studios replete with bright lights, staring cameras, hordes of people, hanging wires, gadgets all over, often no students present and often no feedback. They were asked to 'produce a program,' not teach a class . . . . Such teaching took too much of their time for too little reward" (Martin-Vegue, et al., 1972, p. 37). There were numerous successes, however. Chicago's TV College, for example, has been functioning since 1956 as an extension of the City College of Chicago (Naylor, 1984; Hudspeth and Brey, 1986.)

The Public Broadcasting Corporation's Adult Learning Service was begun in 1981 to provide high-quality software via the PBS network. The development of software meeting rigorous standards of academic and productional quality had been ongoing for more than a decade by various institutions across the nation. This effort was greatly enhanced when, in 1981, Ambassador Walter Annenberg provided a $150 million grant to be allocated at the rate of ten million dollars per year for fifteen years for software development (Linking Californians, 1981). The Corporation for Public Broadcasting was designated to administer these funds and the Annenberg/CPB Project was begun.

Because of underutilization of ITFS channels, the private sector petitioned the federal government in the early 80's to release them for commercial purposes. This threat stimulated interest among educators in acquisition of ITFS licenses and creation and use of such systems (Tate and Kressel, 1983). Recent deregulation of the telecommunications industry and the FCC's "open skies" policy providing access to satellite technology have paved the way for increased use of information technologies (Hudson and York, 1983). As Martin-Vegue says, "[Television] is a mature technology" (p. 36).

Its extensive use over a period of more than fifty years for instructional purposes has resulted in a plethora of research reports. McBride (1966) says, "It is possible that in the entire history of education no single facet has been subjected to as exhaustive testing and experimentation and research as has educational television" (n.p.). He notes that "literally thousands" of different research projects have been conducted.

Chu and Schramm note that a large number of television studies are comparative and utilitarian. They are designed to demonstrate that televised instruction is equivalent to traditional instruction and thus "convince people in administrative positions that television can indeed be used for a variety of instructional purposes" (Chu and Schramm, 1967, p. 110).

What the Research Says

The technology available for use to offer instruction via television is awesome. Technology, however, often induces a tendency to do what is possible rather than what is desirable. Often nowadays, for example, while a customer waits to pay his bill, a store will exercise

its computer-enhanced ability to take inventory. That the technology provides the capability of offering instruction to distance learners is unquestioned, but does the message match the medium?

Review of Reviews. There is a large body of literature which reports on reviews of existing research reports. The landmark study of this kind was by Chu and Schramm, published in 1967 and cited in numerous other reviews. The authors compiled 207 published studies in which television teaching was compared with conventional teaching. Of 421 separate comparisons made in these studies Chu and Schramm found that 308 showed no statistically significant differences in student achievement. Sixty-seven of the studies showed television instruction to be superior and 50 found conventional instruction better. This study updated a similar study by Schramm in 1962 in which he reviewed 393 experimental comparisons of television versus classroom teaching, including a large number of unpublished studies. He reported that 255 of these comparisons resulted in findings of no significant difference. Eighty-three found significant differences in favor of televised teaching and 55 were significantly in favor of conventional teaching. In 1975, Chu and Schramm updated their earlier study under contract with the U.S. Department of Health, Education, and Welfare. Some of the reviews included in this report were obtained from that document.

Questioning the methodology employed in research on televised instruction, D.W. Stickell in his doctoral dissertation (1963) for the Pennsylvania State University applied rigorous methodological standards to 250 experimental comparisons of televised and classroom instruction. He found that only ten met his rigid requirements for adequate experimental design. (Interestingly enough, all ten were studies conducted

at the Pennsylvania State University.) Of the ten which met his criteria for acceptable research, Stickell found no significant differences in learning at the commonly accepted levels of statistical significance. Stickell judged 23 other studies to be marginally acceptable. These studies also showed no difference between face-to-face and televised instruction. Chu and Schramm suggest that the studies which methodologically did not conform to rigid standards of clean experimentation reflect the results of practical limitations and realistic conditions. They argue that not all bias would occur in the same direction and that the statistical law of random operation would apply (Chu and Schramm, 1975).

Dubin and Hedley in 1969 conducted an analytical review of 381 experimental studies in which classes taught by television were compared with control classes receiving no televised instruction. The authors identified 42 such studies that could be considered comparable on the basis of several criteria including similar methods of instruction and identical examinations. The studies compared televised instruction with face-to-face teaching by lecture, a combination of lecture/discussion/demonstration, or discussion. It was concluded that one-way instructional television produced the same amount of learning as the compared methods (O'Rourke, 1980; Chu and Schramm, 1967).

O'Rourke did a selective review of research spanning a thirty year period from 1949 to 1979 using established criteria for selection. He cites a Reid and MacLennan (1967) review of nearly 350 research projects on instructional film and television conducted between 1950 and 1964. Most of these studies involved comparison of televised instruction with direct face-to-face instruction. Most showed no

difference between the learning and performance of students who were instructed by television and those taught traditionally. Reid and McClennan note that the studies were uneven in quality and that the findings did not prove no difference exists. They suggested, however, that the studies should give educational administrators confidence that instructional television is among the alternatives that can reasonably be considered for use (O'Rourke, 1980).

Other studies cited in reviews of the literature include Kanner, Runyon, and Desiderato (1940) who found that 400 United States Army trainees learned as well or better when taught by television as they did when taught conventionally (O'Rourke, 1980). Chu and Schramm reviewed six experimental studies comparing the achievement of students viewing TV at home with students who viewed TV on-campus and/or received conventional instruction. The assumption was that on-campus TV instruction would be more effective because of social support, competition, interaction, and supervision. In each study the at-home group was found to achieve as well or better than the on-campus groups (Chu and Schramm, 1975). Sales (1976) reports that an intensive examination of test results conducted at Chicago's Television College in 1960 indicated that students receiving televised instruction performed as well on examinations as students receiving classroom instruction. Kelly's review covering the period 1956-1961 of performance in matched achievement test comparisons in English, mathematics, science, and social studies indicated that television students performed as well as on-campus students (Chu and Schramm, 1975). Pflieger and Kelly, in a 1961 report, summarized the results of a three-year national program funded by the Ford Foundation in which

200,000 students from 800 public schools were involved. On more than 300 matched achievement tests, 119 of the television-taught students performed significantly better. Forty-four of the comparisons showed conventionally-taught students performing better. The remainder showed no significant difference (Chu and Schramm, 1975; Sales, 1976).

In a Canadian study, a lecture was presented to a studio audience, was heard simultaneously via radio, and was seen and heard via TV. A fourth group read the lecture. Post-tests of content administered immediately after the lecture and readministered eight months later showed that the mean score of the TV group was significantly better than the radio group which in turn was significantly better than the studio audience or the readers (O'Rourke, 1980). Chu and Schramm (1975) reported extensively on studies of the Washington County School System, Hagerstown, Maryland, which had fully integrated use of television in its instructional program. Student performance in both rural and urban areas was measured on standardized test of achievement. In comparison to the national norms on the same standardized tests, striking gains were found to have occurred in most subjects at most levels by the students taught via television. In a 1961 study by Janes, 375 college students chose whether to take a class at home via television, to take the same class on campus via television, or to take the identical instruction from the same teacher in a traditional classroom setting. Forty-seven percent of the students chose to take the instruction via television. Eleven percent of those who initially chose face-to-face instruction changed during the course of the semester to the television format. Only two percent of the TV students changed to obtain face-to-face instruction. Students who chose to

watch the instruction via television at home reported the highest level of satisfaction among the three groups (Chu and Schramm, 1975).

O'Rourke notes that the British Open University, which has had extensive experience in offering televised instruction, reported that of 64,000 students which had been enrolled in television classes up to 1977, 91.4% had been successful in earning college credit for courses taken (O'Rourke, 1980). Material for this report was requested from BOU. At the time of writing, it had not arrived.

Chu and Schramm note the wide variety of instruction which has been offered via television including chemistry, anatomy, public speaking (with on-campus presentations), driver education, and even typewriting. A study by Pasewark in 1957 indicated that television-taught students learned to type significantly faster and somewhat more accurately than those taught in the traditional mode by the same instructor (Chu and Schramm, 1975). Chu and Schramm state "so far as we can tell from available research evidence, there is no general area where television can not be used efficiently to teach students" (1975, p. 29).

Various authorities who have reviewed the literature either for publication or for personal use testify that television is an acceptable alternative to traditional methods for providing instruction (Sales, 1976; Parrin, 1977; Leveille, 1986; Gerbner, 1986; Reid and MacLennan, n.d.). Chu and Schramm sum up: "There can no longer be any real doubt that children and adults learn a great amount from instructional television . . . . The effectiveness of television has now been demonstrated . . . in many parts of the world, in developing as well as industrialized countries, at every level from pre-school through adult

education, and with a great variety of subject matter and methods" (1975, p. 20).

Review of Telecourse Research, Evaluation, and Production. Subchapter J of the Board's rules and regulations defines "telecourses" as "The subset of televised instruction that use pre-produced television programs as the primary mode of instructional delivery." Telecourses are made up of video "telelessons" with study guides, standard texts, and other print materials comprising a major portion of the course.

Michigan's The Complete Issue Papers of the Governor's Commission on the Future of Higher Education (1984) concedes that instructional television "has a lot to live down" because of past "talking head productions." The report states, however, "The design, quality, and production of the modern telecourse has vastly changed" (p. 283). Dirr concurs: "In the past five years, both the academic and production quality of those courses has increased significantly. Today's television courses combine both good television viewing and the best scholarship available in the country" (Dirr, "Come home. . .", 1985, p. 98). Research and evaluation of telecourses remains suspect, however, because most of it has been conducted or sponsored by users, producers, and funders, who might be seen to have a vested interest.

A few examples exist of research conducted by investigators whose objectivity cannot be questioned. Rollyson (1984) describes the use of televised courses in conjunction with workshops and on-campus conferences as a part of a humanities course in Wayne State University's "Weekend College." Rollyson concluded that television is "a powerful tool for learning, provided that it is respected as a mode of communication in its own right" (p. 9). Steinke and Griffin describe

the experience of Waubonsee Community College in Sugar Grove, Illinois, (forty miles west of Chicago) in which video-taped cassettes were used to offer telecourses in learning centers and area libraries. Students assessed the rigor of the telecourses as great or greater than on-campus classes (Steinke and Griffin, 1982). Karman, in a report to the Ohio Post-Secondary Telecommunications Council on students who had taken three courses funded by the Ohio Board of Regents, indicated that the students surveyed had a substantial level of enthusiasm for the telecourses (Karman, 1986). In a frequently cited study 233 students at Saddleback College in California were involved in an experimental study which compared the performance of students in seven courses during the 1982-83 academic year. Telecourses and equivalent on-campus courses were taught by the same instructor. Pre-tests and post-tests, designed by the instructor and author, were administered. An analysis of covariance, which provides for statistical control of prior learning, was used to analyze the scores from the pre- and post-tests. In each instance no difference was found in the amount of learning that occurred between telecourse students and on-campus students (Smith, 1983). Chu and Schramm report similar results in an experimental study with 80 college students to test the effect of feedback on learning. No difference was found in learning and retention among four treatments (Chu and Schramm, 1975).

Dallas County Community College District provided 36 separate documents as evidence of the extent, nature, and scope of its continuing evaluation process. In a summary report of the first six years of telecourse offerings at the DCCCD institutions, it was stated that "comparisons of grade distributions for telecourses with their on-

campus counterparts have been made for every telecourse offered by DCCCD" (The first six years, 1978, p. 37). This report was one of several summary reports supplied by DCCCD's Center for Telecommunications. The grade distributions of students who complete Dallas telecourses are equivalent to the grade distributions of students in on-campus classes. A separate listing of the research and evaluation reports supplied by Dallas County Community College District is appended to demonstrate the kind of continuing evaluation of telecourses being conducted by Texas institutions. (See Appendix B.)

DCCCD also has conducted a number of comparative studies using a pre-test/post-test design and analysis of covariance. In every instance both the on-campus and television students registered statistically significant improvement in achievement of the cognitive objectives of the courses under study. In some instances students in telecourses recorded gains larger than the on-campus students; however, in general the results indicated no significant difference.

Topper, et al., (1975) in an extensive study funded by the Corporation for Public Broadcasting, surveyed telecourse students, general audience, and business concerns to determine reaction to the concept of telecourses. Responses of telecourse students were "overwhelmingly" favorable (p. 19). They "seemed to feel that the telecourse lecture material was more highly organized and that the instructor wasted no time with becoming side-tracked with irrelevant questions. They also felt that the telecourses were more convenient and less distracting than courses taught in the classroom" (p. 20). Of 32 responses received from national and local business concerns, 25 approved of the concept provided that credit was granted from an

accredited institution. It might be noted, however, that the business respondents did not believe graduates of an open university aimed at providing a liberal arts degree would produce hirable graduates (p. 40). In a general audience survey, 2,089 community residents were selected randomly for telephone interviews. Many of these respondents felt that the general intellectual level of a telecourse would not be equivalent to that offered in traditional college courses (p. 13). It may be that the general intellectual level of entertainment programming with which a randomly selected general audience would be familiar, biases their perception of instructional television programming. The authors admitted to the possibility of sample bias based on the suspicion of many respondents to the telephone survey. For example, one woman said to the interviewer, "You're not some burglar that I'm going to have to shoot tonight?" (p. 9).

Research Communications, Ltd., surveyed two hundred two-year and four-year college students in 26 geographically dispersed institutions to determine the effectiveness of the first five television-based courses funded by the Annenberg/CPB project. In addition to questionnaires, researchers met with students at mid-semester and final group sessions at each of the institutions for interviews. This study noted that the educational aspirations of telecourse students were high. Almost half indicated that they hoped to achieve a master's or doctoral level degree. Only six percent had no degree aspirations. Students reported that they spent 3.5 hours per week studying for the telecourse and that their performance level equated that experienced in other on-campus courses. This finding held true for students in both two- and four-year institutions. The Annenberg/CPB telecourses were per-

ceived to be as difficult, interesting, and challenging as on-campus classes (Research Communications, 1985; Dirr, Are television, 1985).

A draft report of a study conducted by the ELRA Group, Inc., for the Annenberg/CPB Project and the PBS Adult Learning Service was supplied even though the data are still undergoing analysis. In this study, 154 randomly selected telecourse administrators and 154 randomly selected telecourse faculty were interviewed by professional telephone interviewers. The executive summary indicates that "half of the faculty respondents rate the performance of students in Annenberg/CPB Project telecourses equal to that of students in non-telecourses. Another third say telecourse students perform better."

Michael and Knapp-Lee (1985) conducted a comparative study funded by The California Community College Fund for Instructional Improvement. This quasi-experimental study compared two groups made up of students in six telecourses and corresponding traditional classes on a number of dimensions. As a pre-test, the researchers administered a practice test for the College Level Examination Program (CLEP) published by the Educational Testing Service. The post-test used was the standardized CLEP test which enabled the researchers to compare student performance with national norms. The means of test scores of all six telecourse groups was higher than the national norm. The means of test scores of three of the six regular classes were higher than the national norms in the pre-test CLEP. Insufficient numbers of students completed the post-test in three classes, however, in the remaining three, telecourse student means were higher than those of the on-campus classes. Grades were equivalent (Michael and Knapp-Lee, 1985).

The Michael and Knapp-Lee study was conducted with students

enrolled in Coastline Community College, Fountain Valley, California. Coastline is one of several community colleges which comprise the Coast Community College District. Prior to the Michael and Knapp-Lee study, an incident occurred resulting in the investigation and evaluation of Coastline telecourses by The California State University. During spring, 1982, several CSU deans and academic vice-presidents received copies of a letter signed by 67 faculty of Orange Coast and Golden West Colleges in the Coast Community College District alleging that Coastline TV courses were lacking in educational quality. A copy of the letter reached the Statewide Academic Senate which requested the Chancellor's office to investigate. In a tightly-reasoned but extensive report, Dr. Robert Bess, Assistant Vice-Chancellor for Academic Affairs for the California State University, concluded that of thirty-eight telecourses offered by Coastline only two were questionable in terms of academic content and only one (which has since been withdrawn from the market) should be subjected to further study. Dr. Bess recommended to the General Education Course Review Subcommittee that the remaining Coastline telecourses not be subjected to further questioning.

Dr. Bess examined time requirements, grading practices, student performance, and faculty involvement as a part of his analysis. He noted that of 579 students who had taken telecourses at Coastline and who requested transcripts during a specified period, 355 transferred to CSU. Of these transfers, 86 percent earned satisfactory grade point averages at four-year institutions. Only four percent withdrew. He noted also that grades earned by telecourse students at Coastline were comparable to those earned by students in traditional classes with the

on-campus students slightly more likely to have earned grades of A or B (Bess, 1983).

It should be noted that production of telecourses requires the investment of hundreds of thousands of dollars. To protect that investment, producers, of which Coastline is one, must provide academically acceptable telecourses. Pohrte says, "[Academic transfer courses] must possess the scope and validity that will withstand the critical scrutiny of scholars across the county" (Pohrte, Appendix II, pp. 4-5).

Development and production of telecourses by national producers follow roughly the same format which includes extensive use of local and national content specialists. Development procedures described here were supplied by Coast Community College. A similar development and production process description was supplied by DCCCD.

Once a producer has identified need for a new telecourse through national market research, a National Resource Team composed of local and nationwide authorities in the subject field is selected. This team is responsible for reviewing texts and sample course outlines obtained from a variety of colleges and universities. The National Resource Team develops a resource list consisting of experts in the field, films, visuals, and print materials and convenes to establish course objectives and major units of study.

The producer's Design Team prepares preliminary recommendations, based on the work of the National Resource Team, for the style, treatment, and format of the video portion of the course as well as recommendations for the print materials (text, study guide, and supplementary materials). The Design Team collects and examines

existing related visual and print resources and engages an "Academic Team" of local/regional subject matter specialists. This team reviews and evaluates the recommendations of the National Resource Team and provides additional suggestions for resource persons and materials. The primary task of the Academic Team is to review the course objectives and major units of study developed by the National Team, to develop learning objectives for each unit, to sub-divide the units into lessons, and to identify authorities for each lesson.

Concurrently, academicians are selected and commissioned to evaluate texts in terms of the learning objectives developed by the Academic Team. The Design Team selects the most appropriate standard text on the basis of this evaluation process. Academics similarly evaluate existing visual resources which might be incorporated into telelessons using established objectives as criteria. With the continued assistance of academic specialists, the Design Team prepares program and lesson outlines and ascertains in concert with the producer/director the program content and video treatment. The producers note that production of a telecourse requires collaboration of a team made up of technical personnel (producers, directors, graphic artists, film crews, etc.), instructional designers, academic consultants, and scriptwriters. "Unilateral decisions are not only unpopular, but unworkable," according to Coast.

A separate validation team which includes specialists in instructional design and the subject matter engage in a continuous process of evaluation throughout the development and production of a telecourse. The team is responsible for ensuring content accuracy and fidelity to course and lesson objectives. This team also must ensure the accuracy

and validity of test bank items which are a part of the telecourse package.

Study guide materials and faculty manuals are developed in conjunction with the telecourses and published either by commercial or private publishers. Study guides are an integral part of a learning package that includes telelessons, text, supplemental materials and testing. The study guide and faculty manuals also are produced by a team which includes instructional design specialists and subject matter authorities.

Once a telecourse is completed, its effectiveness is evaluated; however, the extensive formative evaluation is designed to avoid need for costly program changes. DCCCD provided the summative evaluation of The Write Course conducted in 1985 by Information Transfer Services, Austin, as an example. ITS employed qualitative evaluation by experts in the field of freshman composition to assess course content. The firm also employed a pre-test/post-test design which provided for evaluation based on comparisons among groups of students enrolled in The Write Course and traditional classes at both two-year and four-year colleges.

In its report, ITS stated: "[The data] indicate that The Write Course is a composition course firmly grounded in composition theory and research. . . .[T]he data yield considerable evidence that following one semester of writing instruction, Write Course students perform at least as well, and along several dimensions better than students enrolled in more traditional classes, whether those students be enrolled at a two-year or four-year school" (Information Transfer Services, 1985, pp. 1-2). Specifically, ITS found that Write Course students tested better in informative/expository writing and in

argumentative/persuasive writing than students undergoing traditional instruction. ITS credited a part of this success to the fact that teachers of The Write Course were freed to focus their energies "primarily on what teachers may do best, namely, react to the written texts their students produce" (p. 2). Telecourse faculties interviewed by Board staff during site visits indicate that they provide more extensive comments on telecourse student papers than on papers written by on-campus students.

Funding by agencies which support the development of telecourses is dependent upon assurance of acceptance by the academic community of the product. Mara Mayor, Director of the Annenberg/CPB Project, says:

> . . . academic quality is of enormous importance for the work supported by the Annenberg/CPB Project. We look to assure quality in a variety of ways. First, all of the full proposals that are submitted for funding go through a rigorous peer review process. They are reviewed by a panel consisting of outstanding faculty with strong teaching and research credentials and by administrators (typically college presidents or chancellors), as well as experts in television production and the various interactive technologies. In addition, each full proposal is sent for additional written review to specialists in the particular subject. In all, a total of 15 expert panelists and reviewers typically will make recommendations for each proposal, and those recommendations determine what is ultimately funded.
>
> Each project is developed by a team of scholars who work closely with the production personnel. In addition, each project has an advisory committee made up of leading people in the field around the country. Those advisors are involved in designing the course initially, in reviewing scripts, in screening rough cuts, and in reading drafts of manuscripts.
>
> Once funded every project goes through a pilot phase, during which a complete lesson, consisting of a program and the appropriate chapters of the print materials are developed. Then the pilot lesson is evaluated by a third party evaluator. The purpose of this formative evaluation is to determine whether the stu-

dents actually are learning what the developers intended and to assess faculty reaction to the materials (1986).

The participants are tested on what the materials contained and provide feedback on the strengths and weakness of the lesson so that recommendations can be incorporated into future lessons. The Project can end the contract if materials are unsatisfactory.

Mayor offers evidence that the quality of the telecourses funded by the Annenberg/CPB Project is recognized. In the two years since the Project's first telecourses appeared, they have won more than forty awards.

In addition to professionally produced telecourses, Kelly and Anandam point to successful use of commercial entertainment programs as credit courses for enrichment. Kelly and Anandam are associated with Miami-Dade Community College, another national telecourse producer. Miami-Dade developed curriculum materials including an anthology, study guide, instructional and administrative materials to accompany the 8-part, 12-hour dramatization of Roots which drew 130 million viewers. With the "wrap-around" materials provided by Miami-Dade, 286 colleges and universities offered Roots as a credit course to an estimated 30,000 students. Prior to this experiment with a commercial broadcast, similar "wrap-arounds" have been developed for several PBS series including The Ascent of Man, with about 350 colleges offering it for credit to an estimated 40,000 students in 1974; Classic Theater in 1975; and Adam's Chronicles, 1976, with about 365 institutions offering it for credit (Kelly and Anandam, 1977-78).

A report by the California Postsecondary Education Commission issued in 1979 states that "remote mediated learning combined with

appropriate contact with live instructors and peers, can be at least as effective and significantly less costly per unit than traditional classroom lecture modes" (Using instructional, p. i).

Review of Live, Interactive TV Research. Live, interactive television is that which is offered via satellite or microwave delivery systems in real time to students who have immediate talk-back capability with the instructor. Usually, a traditional class is being taught concurrently. This section reviews the literature on live, interactive televised instruction. It touches on research in audio-teleconferencing which is two-way interactive instruction with no video component. It also reviews some variations of instructional television which have developed from interactive experiences.

The use of ITFS to offer live, interactive instruction is widespread and experience with this medium spans a period of more than twenty years. The Association for Graduate Education and Research of North Texas (TAGER) was one of the first networks established to offer higher education to remote sites. Maher (1984) reports that 101 colleges and universities held FCC ITFS licenses in 1982. This represents almost 40 per cent of the ITFS licenses which had been issued at that time.

More recently, the use of satellite transmission has gained momentum. A number of satellite networks are now offering instruction including one in Alaska which is the first truly statewide network. The University of Alaska Instructional Telecommunications Service (UAITS) was established in 1980 and operates the LEARN/Alaska Network. This network serves all units of the University of Alaska, Alaska's 53 school districts, the Department of Education, other agencies and the

general public. Two hundred thirty communities receive instructional television and 200 communities are equipped for audio-teleconferencing.

A less extensive body of experimental research is available on live, interactive instruction; however, a number of universities report successful experiences.

Stanford University established its instructional television network, SITN, in 1969 to offer undergraduate and graduate instruction in engineering, computer science, math, applied physics, and statistics. The University is currently exploring the interests of the Stanford faculty in offering instruction outside the area of engineering and science. Stanford also is considering instruction via satellite to other states including Colorado, Texas, Massachusetts, New York, and Washington (Campus report, 1983).

The University began experimenting several years ago with tutored video instruction (TVI) to reach students who are unable to participate in live, interactive classes. TVI uses unrehearsed, unedited video tapes of on-campus lectures. These taped lectures are played to small groups of three to ten students at industrial locations by a para-professional tutor responsible for stopping the tape at frequent intervals for discussion. Stanford reports success with this method and is providing tapes for TVI instruction in the United States as well as in Mexico, China, Japan, Korea and England (Gibbons, et al., 1977; Gibbons, et al., 1986; Allen, 1983).

Burnette (1986) in a personal letter reported the results of a three-year study completed in 1983 which compared the performance of full-time Stanford students, students obtaining instruction via the live, interactive ITFS system, and students taking tutored video

instruction. The results of this study, obtained from Judith Lemon, Associate Director of the Stanford Instructional Television Network, follow:

Number of Students	Type of Instruction	GPA
16,652	Traditional, on-campus	3.40
1,771	Live, interactive video	3.39
308	Tutored video instruction	3.47

Stanford considers its instructional television program to be the largest and most successful in the United States. It has been cited by MIT as a national model for lifelong learning. Hewlitt-Packard President John Young, a Stanford trustee, says "SITN is the only case I know of where a top-flight university has been able to increase its productivity without in any way degrading the quality of its educational program" (Campus Report, 1983). Allen (1983) notes that SITN has proved to be a significant recruiting tool for area companies.

Arizona State University has offered televised credit courses since 1958 via the University's public television station and ASU cable. In 1982, ASU was licensed by the FCC to operate an ITFS system. Since the network began operation, course offerings have grown to 55, the University has increased the number of classroom studios from one to four, and the number of receive sites has grown from five to thirteen. To date more than 2,000 students have received instruction via the network. Statistical studies have been conducted to determine the extent of difference in academic performance of students taking instruction at remote sites with those taking instruction offered concurrently on-campus. Overall there was no statistically significant difference in the academic performance of the two groups; however,

there were some differences by colleges and by level. Survey research conducted annually indicates that students, faculty, and company coordinators are satisfied with the system and the instruction. Annual comparison of grade distributions have yielded results which indicate that remote students are not at an academic disadvantage in comparison with their on-campus counterparts (Wagner, 1984; Maher, 1984; Wagner, 1985; Craft and Wagner, 1985).

California State University-Chico has been using interactive television for more than ten years. Although no experimental studies of the effectiveness of instruction at Chico State were obtained, Meuter, in a personal letter (1986) says, "We offer over 50 courses each academic year and broadcast over 70 hours of university course work per week. We have found this method of delivery both academically effective and economically efficient."

Roth (1980) describes an experimental project to offer instruction to teachers in Virginia via a two-way interactive ITFS system funded primarily by the federal government. Evaluations indicated that the teachers both liked the system and believed they had gained significantly in knowledge.

In an article published in 1977, Curtis and Blatecky reported on a two-year research study to determine the utility of ITFS systems for the delivery of instruction to various student populations. The study, called Project TIMES (Telecommunications in Medical and Educational Services), was conducted by the Center for Excellence, Inc. (CenTeX), a non-profit, educational/medical research and resource development corporation located in Williamsburg, Virginia. On the basis of survey of 63 ITFS operators, Project TIMES determined that ITFS systems are

being used "to deliver structured curricula to more than 72,000 pre-high school students, 3 million school-age students, 28,000 college-level students, 51,000 post-graduate students (engineers, doctors, and other professionals), 140,000 continuing-education students (in-service teachers, nurses, paraprofessionals), and 4.1 million senior citizens (including institutionalized patients and church parishioners) -- a total of 7,576,593 'students' of all kinds" (p. 40). The authors conclude: "ITFS has successfully demonstrated its usefulness as a delivery system for all levels of education in all parts of the United States" (p. 40).

Ellis and Mathis (1985) reported a controlled experimental study using live video without an interactive component. One hundred seventeen students enrolled in two introductory sociology courses at Minot State College, Minot, N. D., were randomly assigned to classrooms in which the instructor was delivering lectures live or to classrooms in which the instruction was being received on TV monitors. At the conclusion of six lectures in each course, the classes were switched so that each group received both live and televised instruction. All students were administered identical tests. Learning under the two lecture modes was statistically equivalent. Class attendance was unaffected by the mode of instruction.

Survey research spanning a four-year period indicates that the Kansas Regents Continuing Education Network (TELENET), an audio teleconferencing system which has been used for instructional purposes since 1970, is successful. TELENET reaches 70 sites statewide. A 1972 comparative study headed by Donald P. Hoyt, Assistant Provost of Kansas State University, found that telephone students and on-campus students

were equally successful academically (Kruh, 1983).

Interactive video tape and videodisc are technologies for which considerable instructional success is claimed. Numerous studies are available on the effectiveness of these technologies; however, they were considered to be outside the scope of this review.

No controlled experimental studies of live, interactive televised instruction delivered via satellite were obtained. Sharpe (1980) reports a pilot project using the Canadian Communication Satellite Anik-B, which included an evaluation component employing a pre-test/post-test design. At only two of the eleven receive sites was this methodology actually employed. The data were considered insufficient for a definitive statement; however a review of examination results suggested that the project effectively produced learning. Instruction was offered from an uplink at the British Columbia Institute of Technology to ten widely dispersed and largely unaccessible centers in British Columbia and one in Yukon.

Networks in Texas, Utah, and Oklahoma are currently offering high school education via satellite. Texas Education Agency is evaluating the Texas Interactive Instructional Network (TI-IN); however, no report is available at this time. Dr. Victoria Bergin in a personal letter (1986) reports, "There are successes and a few failures in terms of overall student achievement."

Pam Pease, Research Director and Manager of the Western Division of the TI-IN network, provided information regarding the evaluation program that has been conducted during this first year of operation of TI-IN. Each school district selects the students that can take instruction via TI-IN. Before the network aired, Pease obtained

baseline data on 300 students. She has administered bi-monthly questionnaires and has also conducted interviews at various sites with administrators, parents, students, and teachers. Analysis of data is incomplete; however, Pease provided a two-page preliminary report on request. Data suggest that student achievement has been consistent with that experienced in traditional classes ("Evaluation is stressed," 1985; Pease, 1986). Although there are few evaluations of instruction offered via satellite, successful experiences with ITFS systems can be generalized to this technology since mode of instruction is identical. The technology for satellite communications is judged to be "extremely reliable" (Hough, 1982, p. 60).

Research on Televised Instruction: What the Critics Say. Many of the critics of research on televised instruction concede that equivalent learning between television and on-campus students has been demonstrated by the many comparative studies; however, they question the value of the research itself (Allen, 1971; Wood and Wylie, 1977; Solomon and Clark, 1977; Jonassen, 1981; Clark; 1983). The comparative studies are seen as having been necessary to gain acceptance of the technology by decision makers. Allen (1971) says, "[T]he educational establishment demanded proof of the effectiveness of these innovative techniques, and the baseline for comparison was clearly the current teaching practices (p. 6).

The flood of comparative studies dwindled to a trickle when a number of reviews of research, especially the Chu and Shramm studies of 1967 and 1975, led to the realization that television is no more than a communication device that transmits instruction from one place to another. Clark (1983) says, "The best current evidence is that media

are mere vehicles that deliver instruction but do not influence student achievements any more than the truck that delivers our groceries causes changes in our nutrition" (p. 445). The critical factor in determining student achievement is now recognized to be the instruction itself (Wilkinson, 1984; Meuter, 1986; Heckman, 1986; Bergin, 1986). Bergin (1986) says, "Televised instruction is neither superior nor inferior to traditional classroom presentation. The question is not which medium works best, but what is effective instruction?"

The primary complaint of the critics is that very little research has been done to identify the unique qualities of television and to determine how to exploit them to improve instruction. One of the criticisms of instructional television is that it has not been proved to produce educational outcomes <u>better</u> than traditional instruction (Muzzin, 1981; Instructional Design Services, ASU, 1983). Some researchers suggest that new directions in research on instructional media may lead to knowledge which, when applied to instructional television, could result in increased student achievement (Instructional Design Services, ASU, 1983; Allen, 1971; Sales, 1976). Sales (1976) quotes a personal letter from Wilbur Schramm which criticizes research designs in which "neither television nor face-to-face teaching is used for what it can do best. What you want to look for is studies of ITV used in its most effective way, and classroom teaching being used most effectively, and then try to isolate the <u>differences</u> in what can be done with the two . . . . Television is a very flexible medium, but it makes its most effective contribution when its being used like television, not like classroom teaching" (p. 7). Critics currently are calling for research in instructional television which poses questions

related to variations within the medium itself, which uses more sophisticated multivariate statistical techniques, and which seeks to develop a theory of distance learning (Williams and Stanford, 1977; Wiesner, 1983; Salomon and Clark, 1977).

Other Issues

Several issues not directly related to the effectiveness of televised instruction surfaced during the review of the literature. Although these issues fall outside the scope of this report, they appear worth consideration.

The Television Generation. Technology gave birth to the "information age" by providing a power over information not available to proceeding generations (Hudson and York, 1983). In the last thirty years millions of children have grown up with television and other communication technologies an integral and pervasive part of their life experience. Berkman (1977) characterizes the issue colorfully:

> I find it Kafkaesque that some tens of millions of children emerge daily from a media-saturated environment to enter schools where they continue to be taught by the same insipid, tedious and all but totally non-electronic, labor intensive methods which have debilitated youthful minds ever since the collective wisdom first mandated that shutting young people up in a box, to be talked at, tested and turned off, constitutes the essence of good education" (p. 96).

Berkman perhaps overstates the case and it is probably reasonable to assert that use of instructional media at all levels of education has increased in the decade since the article referenced was published. The point Berkman makes, however, is salient. The "Television Generation" may be most amenable to electronically-mediated instruction and may profit from its use even more than the student populations involved in earlier research.

Access and Attrition. Distance learning is seen by its proponents as a way to provide access to education which otherwise would be unavailable. In a definitive study funded by the Annenberg/CPB Project, Brey and Grigsby (1984) surveyed 8,000 telecourse students nationwide and developed a profile of the "typical" telecourse student. She is older, white, married, employed, has one or more children, and has earned some college credit (20% of those surveyed had earned an associate or higher degree). Brey and Grigsby's research supports contentions that telecourses serve a student population which might find traditional instruction difficult, if not impossible, to access. Interestingly, the demographic profile developed by Brey and Grigsby matches almost exactly the profile that Hobbs (1976) discovered in his study of the characteristics of students most likely to complete telecourses.

Live, interactive television is seen to serve primarily working professionals: teachers, practicing physicians, dentists, nurses, engineers, and scientists. For example in Brown's 1972 survey of 3,400 physicians in hospitals in the Midwest, it was discovered that those with access to video taped or closed circuit television instruction devoted substantially more time to education than those without such access.

Attrition rates are an issue of concern to state-level policy makers; however, the research examined addressed attrition only peripherally. Schramm says, "[T]here is invariably a considerable shrinkage in numbers between registration and completion . . . depending on the type of course and the amount of control and support given the student" (Schramm, Big media, p. 190). He reports overall completion rates at Chicago's Television College and Britain's Open

University, however, as 75% and 84% respectively.

Two points regarding attrition might be considered. First, institutions with "open door" admission policies reasonably expect high attrition since the intent of such policies is to provide an educational chance for the doubtfully qualified. Second, the actual numbers that withdraw appear to be more significant than attrition rates expressed in percentages. For example, the materials examined during the course of this review indicated that, at some colleges, the number of students who withdrew from on-campus courses exceeded the total enrollment in the equivalent telecourses.

Cost-Effectiveness. In a recent article in the Dallas Morning News, Perelman states, "The costs of education and training have become the biggest single item of spending in the U.S. economy and are rising several times faster than personal income" (1986, n.p.). He puts the cost at $300 billion a year with $80 billion of that amount being borne by employers in programs of employee education and training. Curtis and Blatecky, writing in 1977, indicated that at that time three out of every ten Americans were employed in some aspect of education, which they termed the nation's third largest industry. They say, "Some qualified authorities have even predicted eventual economic bankruptcy for America's educational processes" (p. 36).

Education is "one of the most labor-intensive 'industries' in existence" (Wilkinson, p. 3); yet, according to Curtis and Blatecky, "in terms of per-employee production [it] is probably the lowest of America's top ten producers" (p. 36).

The use of instructional technology is strongly endorsed by these writers to increase the cost-effectiveness of education. Curtis and

Blatecky accuse education of being "the only major American industry today that fails to make maximum use of modern technologies to . . . reduce its costs" (p. 37). Perelman says, "Out of sheer necessity, the demand for cost-effective instructional technology is about to explode."

This review did not encompass an extensive examination of the cost issue; however, one major study suggests the efficacy of instructional television for reducing educational costs. Morris headed a panel of California educators and industrialists which investigated the cost-effectiveness of offering continuing engineering education by television for the American Society of Engineering Education. The study involved 26 universities using live and video taped engineering instruction (Morris, et al., 1974). The authors concluded "that, in properly planned, implemented and mature systems, the cost of off-campus student instruction by TV can be significantly lower than serving the equivalent students on-campus. Almost always there is a transient 'start-up' phase where student participation does not cover all incremental ITV costs" (p. i).

One of the interesting aspects of this study was that it addressed the "hidden" savings in such things as energy conservation, the environment, safety, and out-of-pocket money. With the Stanford ITV program as the source of data, the panel calculated an annual savings to students of $700,000 in 1974 dollars from such things as transportation costs, commuting time, etc. (Morris, et al., 1974).

Chu and Schramm note that, from the perspective of cost, televised instruction should be directed toward "large goals and many users" (1975, p. 37). Perelman dramatizes the point when he says, "Sesame

Street, one of the most expensive but also most successful educational TV programs, costs one cent per viewer hour."

Resistance. If the effectiveness of televised instruction has been demonstrated, as the research suggests; if it truly can reduce instructional costs, as may be the case; and if it does, in fact, provide access to a disfranchised population, the question becomes: Why isn't everybody using it extensively?

Certainly there is an innate tendency to be wary of the unfamiliar. In the public mind innovation in education and educational problems spotlighted in recent reports (Goldberg and Harvey, 1984; Passow, 1984) may be equated. Anandam and Kelly (1981-82) note, however, that even the print medium, so taken for granted today, was resisted and rejected when the printing press was introduced. The reasons for its rejection sound familiar: loss of the human touch, loss of jobs, damage to traditional values, and the necessity to develop new skills. Decades passed before the printing press was accepted and utilized fully.

Roos, et al. (1973) in a program audit for a New York State Legislative Commission described the seriousness of the problem of resistance to the use of technology and identified a number of factors contributing to underutilization. The State of New York made a substantial commitment to the use of instructional television in the expectation of an increase in productivity and a decrease in educational costs. These expectations went largely unrealized despite SUNY studies demonstrating that productivity could be increased and cost savings effected if instructional technology were properly employed.

Roos' report faulted University administrators for failure to

allocate adequate funds to support instructional television but noted that some campus centers had proved effective despite low budgets. Among additional factors cited as contributing to underutilization were:

1) Inadequate faculty rewards (in terms of tenure, promotion and pay) for preparing instructional programming and using television for innovative teaching.

2) University policies related to copyright, revision, and use of television programming.

3) Budgeting practices based on student/faculty ratios which provided no incentives for increased productivity.

Chu and Schramm say, "If instructional television is to play a large part in [education], it needs strong support from the top" (1975, p. 37).

The recent report of the Governor's Commission in Michigan (1984) identified yet another problem. It says, "A similar situation exists for educational television that exists for most other aspects of the issues facing higher education and that is Michigan's autonomous system does not encourage or reward cooperation" (The complete issue, p. 287).

Faculty resistance to use of technology is often mentioned and was in fact, cited in both the New York and Michigan reports. Concern about loss of jobs appears paramount. It might be noted, however, that some educational administrators are turning to televised instruction to fill gaps created by teacher shortages. Also, experience has proved that many "non-traditional" students who enter or re-enter higher education by taking a televised course often continue their educations in on-campus classes. It may well be that instructional television,

like the printing press, will result in more, not fewer, jobs.

Summary

In Part One of this report, published and unpublished literature has been reviewed in an effort to determine if televised instruction is effective. In summary, Chu and Schramm's findings of more than a decade ago still hold to this day: "Instructional television does make it possible to share teaching more widely. It can share the best teaching as well as ordinary teaching . . . . If new ventures are to be undertaken in education, if courses or materials not now available in existing classrooms can be offered there by television, or if television can be used to extend the benefits of education to children or adults not presently served by existing schools -- then it would appear that television can be used for such purposes with considerable confidence" (1975, p. 119).

PART TWO: POLICY IMPLEMENTATION PROCEDURES AND STATUS REPORT

The purposes of this unit are 1) to describe staff procedures for implementing those sections of Subchapter J which relate to quality, and 2) to provide a report on a recently conducted survey of the institutions which have received Board authority to offer televised instruction.

Policy Implementation Procedures

Subchapter J requires each institution to obtain Board approval of an Institutional Plan for Televised Instruction. The Board's Advisory Committee on Telecommunications is charged with the responsibility of reviewing each Plan and making a recommendation to the Board. The procedures employed by the staff and the advisory committee for review of these Plans should provide evidence that demonstration of high standards of quality is the sine qua non for a recommendation of approval.

With assistance from the advisory committee, the staff drafted guidelines for Institutional Plans based on the requirements of Subchapter J and on specific indicators of quality ITV programs identified in the 1983 report of the Board's Telecourse Study Committee. The advisory committee adopted 15 criteria against which each institution's Plan is measured. (See Appendix C.)

Plans are analyzed on receipt and synopses prepared for the advisory committee. A site visit is conducted at each institution proposing to offer televised instruction. Whenever possible a member of the advisory committee accompanies the staff. Site visits include interviews with central administrators, program administrators, support

personnel (librarians, testing center personnel, etc.), technical staff, oversight committees, and faculties. Facilities and equipment are examined.

The advisory committee reviews and discusses the Plan and the site visit report before preparing its recommendations for the Board. The advisory committee expects all criteria to be satisfied to warrant a recommendation for approval.

The staff takes the responsibility for ensuring that adequate information has been supplied for an advisory committee decision. To date, two plans have been returned to the institutions as inadequate. In one instance, two site visits by the staff and advisory committee members were conducted before convincing evidence of commitment to quality was obtained.

Subchapter J also requires that all courses proposed to be offered in any given academic year be submitted to the state's Regional Councils and Area Conferences for approval. Although this approval process is designed primarily to address territorial questions, it is a form of peer review which should contribute to the effect of ensuring quality.

The rules and regulations call for a statewide review of televised instruction in 1989. An ad hoc committee to assist the staff in drafting guidelines for a self-study instrument met on November 21, 1985. The guidelines are near completion and should be ready for distribution to the institutions for comments before the fall semester begins. The self-study and statewide review are additional efforts to promote high quality standards.

In summary, the procedures which have been employed by the staff and the Advisory Committee on Telecommunications are characterized by a

rigorous adherence to those principles which are known from experience and research to contribute to successful, effective use of television to offer instruction. Plans brought to the Board undergo careful selection, thorough analysis and meticulous scrutiny, perhaps more so than the review of literature would indicate is necessary.

Status Report

Since the Board adopted its rules and regulations, eleven community/junior colleges or systems comprising more than one campus have received Board authorization to offer telecourses. All of these institutions with one exception responded to a survey questionnaire supplied by the staff which called for a report of total enrollments in telecourses, in the equivalent on-campus courses, and grade distributions (in percentages) for courses offered by each mode of instruction. The one institution which did not respond is part of a system, is small, and possibly offered no telecourses. The staff intends a follow-up query. One institution supplied grade distribution data which appeared inaccurate. These data are not included in the report; however, the staff has requested clarification.

During the fall, 1985, and the spring, 1986, semesters, the eleven community/junior colleges (or systems) offered a total of 131 courses to 18,996 students. It might be noted that six of the institutions which received Board approval in the first year had been involved in offering telecourses for a number of years as a part of the Board's pilot project. Chart 1 shows the number of courses and enrollments at each community/junior college.

Chart 1

Number of Telecourses and Enrollments at Community/Junior Colleges by Semester, 1985-86

Institution	Semester	Number of Classes	Totals	Enrollments	Totals
Amarillo College	Fall	9		247	
	Spring	8	17	240	487
Austin Com. College	Fall	10		510	
	Spring	10	20	566	1,076
Central Texas Col.	Fall	3		257	
	Spring	3	6	296	553
Dallas C.C.C.Dist.	Fall	11		2,994	
	Spring	11	22	3,873	6,867
Del Mar College	Fall	0		0	
	Spring	1	1	41	41
El Paso Com. Col.	Fall	6		362	
	Spring	7	13	338	700
Navarro College	Fall	1		14	
	Spring	1	2	29	43
San Antonio College	Fall	5		1,146	
	Spring	5	10	1,022	2,168
San Jacinto College	Fall	0		0	
	Spring	3	3	162	162
Tarrant Cty.Jr.Col.	Fall	17		3,526	
	Spring	16	33	3,153	6,679
Tyler Junior Col.	Fall	2		78	
	Spring	2	4	142	220
		TOTALS	131		18,996

Of these totals, 64 telecourses were offered in the fall semester to a total of 9,134 students. Sixty-seven courses were offered in the spring with 9,862 enrollments. During the 1985-86 (fall/spring semesters only) year, 118,635 students took on-campus courses equivalent to the telecourses, with 60,027 enrolled in the fall and 58,608 enrolled in the spring. It might be noted that in some instances telecourses were not offered concurrently with on-campus classes. In a few cases, telecourses only were offered. In a few other cases, only on-campus classes were offered. These enrollments are included in the totals above; however, in comparisons of grade distributions, only those courses which were offered by both modes of instruction are included.

The institutions were asked to chart in percentages the A's, B's, C's, D's, F's, and W's awarded in each telecourse they were authorized to offer with the percentages in each grade category in equivalent on-campus classes provided immediately below for comparative purposes. The institutions also were asked to provide withdrawal policies.

One community college calculated percentages of grades A through F on the basis of completers and calculated W's on the basis of initial enrollments. This fact complicated the analysis of data and precluded definitive statewide comparison of means in telecourses vis-a-vis traditional classes.

Distribution percentages fluctuated widely within each grade category. For example, in fall, 1985, one institution reported a high of 55% A's in one on-campus class. There were eight telecourses in various colleges in which 0% A's were reported. No institution reported 0% A's in on-campus classes; however, it must be remembered that the on-campus grade distributions represent a composite of several

courses in most instances. The enrollment figures suggest that there was only one telecourse being offered in each instance in which there were no A's. It may be that there were individual on-campus class sections in which no A's were earned, but they would not necessarily be apparent in the data as reported.

Similar fluctuations were found in other grade categories. For example, there was a high of 75% B's in a telecourse at one institution and a low of 0% B's in a different telecourse at another institution.

There was no pattern of grade distributions in either the on-campus or televised courses. The variations suggest what one might expect to find if one examined the grade books of a number of different teachers on the same campus.

Chart 2 shows grade distributions for the introductory course in government at four different colleges selected at random. Government was chosen for the comparison since almost all institutions offering telecourses include government. Although the grade fluctuation is not as great in this case as in some others, it can be seen that there is no apparent grading pattern.

Chart 2

Grade Distributions in Percentages in Introductory Government Telecourses at Randomly Selected Colleges Fall, 1985

Institution	A	B	C	D	F	W
A	7	18	19	6	3	46
B	13	21	17	3	5	36
C	0	28	31	16	7	18
D	10	25	18	9	5	32

(Chart 2, cont'd)

Grade Distributions in Percentages in Introductory Government On-Campus Classes at the Same Randomly Selected Colleges

Institution	A	B	C	D	F	W
A	14	22	25	9	3	27
B	23	26	19	4	4	21
C	12	24	26	10	6	13
D	13	22	24	11	9	19

The staff calculated the mean percentages for all courses offered via television and for all equivalent on-campus courses at each institution. Chart 3 shows a comparison of the mean distributions in each grade category for telecourses and equivalent on-campus courses at each institution for the fall, 1985, semester. In some cases "Incompletes" were reported but were excluded from this analysis. In many instances the percentages do not total 100 due to this fact and to rounding both by the institutions and the staff.

Chart 3

Mean Grade Distributions in Percentages for Telecourses and Equivalent On-Campus Classes at Eight Community/Junior Colleges, Fall, 1985

Institution	Mode	A	B	C	D	F	W
A	Television	16	22	18	5	3	36
	On-Campus	25	23	20	6	2	25
B	Television	21	28	14	0	14	14
	On-Campus	15	30	17	8	17	10
C	Television	27	25	16	4	11	16
	On-Campus	20	28	23	9	10	10
D	Television	16	16	10	2	8	43
	On-Campus	30	24	15	4	4	26
E	Television	14	25	20	10	14	16
	On-Campus	17	31	21	7	10	6
F	Television	21	24	15	7	12	25
	On-Campus	19	23	19	11	12	16
G	Television	17	24	20	1	0	36
	On-Campus	14	23	29	11	7	18
H	Television	18	32	23	7	20	33*
	On-Campus	23	29	23	8	16	19

* Withdrawals calculated on basis of total enrollment; all other percentages calculated on basis of completers.

It can be seen that in every case attrition rates are higher in the telecourses than in traditional classes. Each of the institutions reporting high attrition rates is in a large, urban area. Each also reports fairly high attrition in on-campus classes. Although the percentage rates are not as high as in telecourses, the actual numbers of withdrawals from on-campus classes in these instances is three to eight times as high as the number of withdrawals from telecourses. In fact, withdrawals from on-campus classes in several of the cases actually number more than the total headcount enrollments at some of

the state's universities. The fact that these are open admissions institutions contributes, as noted earlier, to high attrition in both on-campus classes and in telecourses. It might also be mentioned that attrition rates are relatively low in some telecourses as in some on-campus classes. Rates of 10%, 11%, and 12% were recorded in some telecourses, but this was uncommon. Rates below 10% were more frequent in on-campus classes. It would be interesting to determine if attrition rates in telecourses would continue to be higher if the courses were offered at institutions imposing admission standards.

Percentages of F's are relatively high at some institutions and quite low at others. This fact may be related to the institutions' withdrawal policies. For example, institution A, which has a high withdrawal rate but a low percentage of F's, permits students to withdraw with a W as late as the 14th week of the semester and to withdraw with a WP or WF as late as the 15th week. (All withdrawals are shown as W's in this analysis.) Institution D has a policy that does not permit the WP and WF grades and places the deadline for withdrawal with a W at the 13th week of classes. One institution, which reports a high percentage of F's sets the withdrawal deadline at the 10th week. One institution permits withdrawals with a grade of W through the 8th week, with WP's and WF's awarded through the 15th week. Withdrawal policies apply equally to the telecourse and on-campus students. This fact would account for the similarity in percentages of F's in telecourses and on-campus courses at each institution.

Successful completers post roughly equivalent scores in telecourses and on-campus classes. These data do not suggest that telecourses are necessarily easier than on-campus classes if grade dis-

tributions are an indication. For example, in exactly half of the eight cases shown in Chart 3, telecourse students recorded a lower percentage of A's than on-campus students. At five institutions on-campus students had a higher percentage of B's. In every instance except one, on-campus students recorded a higher percentage of C's.

These data might suggest that telecourse students actually perform less well than on-campus students; however, such is not necessarily the case. Institution H calculated grades A through F based on the number of completers. The percentage scores for the television students at this institution are very similar to those of the on-campus students with 5% more on-campus students making A's while 3% of the telecourse students recorded more B's. When withdrawals are removed from the percentage calculations and comparative grade distributions are based on the scores of completers, it is apparent that telecourse students perform about as well as students taking the same course on campus.

Chart 4 shows grade distributions for students at ten community/ junior colleges (or systems) in spring, 1986. Two institutions offered telecourses for the first time in the spring semester.

Chart 4

Mean Grade Distributions in Percentages for Telecourses and Equivalent On-Campus Classes at Ten Community/Junior Colleges, Spring, 1986

Institution	Mode	A	B	C	D	F	W
A	Television	21	22	16	5	2	34
	On-Campus	24	25	28	6	2	24
B	Television	14	28	10	3	7	34
	On-Campus	17	33	23	9	7	8
C	Television	30	26	9	3	13	19
	On-Campus	15	27	23	9	11	14
D	Television	22	14	11	2	8	39
	On-Campus	29	31	13	2	4	18
E	Television	10	20	26	7	16	13
	On-Campus	16	29	21	6	10	9
F	Television	28	26	9	7	9	21
	On-Campus	24	28	17	11	8	15
G	Television	12	30	20	3	1	32
	On-Campus	15	26	28	11	6	15
H	Television	22	31	21	7	20	30*
	On-Campus	26	28	22	8	17	20
I	Television	12	32	20	0	2	27
	On-Campus	8	15	19	9	15	32
J	Television	17	24	20	4	9	25
	On-Campus	20	23	20	9	7	22

* Withdrawals calculated on basis of total enrollment; all other percentages calculated on basis of completers.

These grade distributions show roughly the same pattern that emerged in analysis of the fall semester data. Attrition rates in telecourses again are higher but in each grade category scores are roughly equivalent. It might be noted that both attrition rates and

the rate of F percentages are slightly lower in the spring semester. This might indicate that during the fall semester some of the less serious or less motivated students chose not to continue either telecourses or on-campus classes. The lower attrition rates in telecourses hold despite the fact that enrollments in telecourses increased by more than 700 students. It might be that students who enrolled in telecourses in the spring had a better acquaintance with the demands of such courses. Higher tuition and fee rates may have contibuted to more serious commitments to complete.

In an attempt to focus on the grade distributions statewide, the staff calculated the mean percentages in the spring semester in each grade category for nine of the ten institutions. The one institution excluded had, as mentioned earlier, calculated withdrawals on the basis of total enrollments while calculating all other grades on the basis of completers. To have used percentages from this institution would have skewed the data. Statewide distribution percentages based on the data reported by these nine institutions appear in Chart 5.

Chart 5

Mean Percentage Grade Distributions in All Telecourses and Equivalent On-Campus Courses Offered at Nine Community/Junior Colleges, Spring, 1986

	A	B	C	D	F	W
Telecourses	18%	25%	16%	4%	7%	27%
On-Campus Courses	19%	26%	20%	8%	8%	17%

As can be seen, percentage distributions are strikingly similar in grades A through F, with on-campus students scoring slightly higher in each category including D's and F's. Again, attrition rates in telecourses are higher; however, these percentages represent approximately

one-fourth of the actual number of withdrawals from equivalent on-campus classes. Withdrawals from telecourses in fall, 1985, numbered 2,466 (27% of enrollments calculated on the basis of data in Chart 3, excluding Institution H) and 9,604 from on-campus classes (16%). For spring, 1986, the withdrawals numbered 2,663 and 9,963 respectively. For 1985-86, 5,129 students withdrew from telecourses while 19,567 withdrew from equivalent on-campus classes. This total of withdrawals from on-campus classes actually exceeds the total enrollments in telecourses.

All except three of the institutions supplied evaluation instruments that are administered to telecourse students each semester. The three institutions have only recently been authorized to offer televised instruction. One of these supplied a report prepared by the telecourse instructor. Several of the evaluation instruments submitted were quite detailed and quite sophisticated. Subchapter J requires frequent, systematic evaluation of telecourses. The staff will continue to monitor institutional evaluation processes.

In summary, almost 19,000 students took telecourses at the institutions authorized to offer instruction in this delivery mode in the 1985-86 academic year. Grade distributions are roughly equivalent in telecourses and their on-campus counterparts with one exception. Withdrawal rates are higher in telecourses; however, in actual numbers almost four times as many on-campus students withdraw as do telecourse students.

In January, 1985, the Board authorized three universities to offer live, interactive instruction via the TAGER delivery system under a limited exemption. Subsequently, one university has received authori-

zation to offer instruction via InterAct, a microwave delivery system serving the Houston area. The four universities offered televised instruction to a total of 889 students in 82 courses in the fall and spring semesters of 1985-86. Chart 6 shows the activity of these institutions.

Chart 6

Number of Courses Offered via Interactive
Delivery Systems and Enrollments by Semester, 1985-86

Institution	Semester	Number of Classes	Totals	Enrollments	Totals
North Texas State	Fall	2		5	
	Spring	4	6	14	19
UT-Arlington	Fall	33		371	
	Spring	38	71	352	727
UT-Dallas		0		0	
UH-University Park	Fall	2		51	
	Spring	3	5	92	143
	Totals		82		889

The University of Texas at Arlington has a long history of offering engineering education via TAGER. The other three universities are new to the television enterprise. Arlington's experience suggests that there is a substantial number of students interested in obtaining instruction offered conveniently through interactive television. The fact that the University of Houston-University Park attracted almost 150 students in its first year suggests that this mode of delivery is meeting access needs of a student cohort in the southeast area of the state.

Thirty-nine TAGER receive sites are approved for use and 45 receive sites are approved for InterAct. During the 1985-86 academic year, students took instruction at a total of 70 receive sites, with some sites having enrollments in both the fall and spring semesters. The number of receive sites in use by institution by semester is shown in Chart 7.

Chart 7

Receive Sites Having Enrollments by Institution by Semester, 1985-86

Institution	Semester	Number	Totals
North Texas State Univ.	Fall	3	
	Spring	6	9
UT-Arlington	Fall	18	
	Spring	20	38
UH-University Park	Fall	11	
	Spring	12	23
			70

The University of Texas at Arlington used a total of 22 different TAGER receive sites of the 39 available during 1985-86 for a 56% use rate. North Texas State had enrollments at seven different sites, an 18% use rate. The University of Houston-University Park used 15 different InterAct receive sites, representing enrollments at 33% of the approved sites. In total 44 different sites of the 84 available attracted enrollments during the fall and spring semesters.

Percentage of receive site use by institution by semester is shown in Chart 8.

Chart 8

Percentage of Approved Receive Sites Having Enrollments by Semester

Institution	Semester	Percentage
North Texas State Univ.	Fall	8%
	Spring	15%
UT-Arlington	Fall	46%
	Spring	51%
UH-University Park	Fall	24%
	Spring	27%

These data indicate that not all receive sites attracted student enrollments in 1985-86; however, some sites are attracting students each semester. The data also indicate that students are taking advantage of the opportunity to take instruction at a number of different sites.

Those institutions offering live, interactive instruction conducted an on-campus class concurrently; therefore, in some instances there were few students enrolled at receive sites. In a few cases the number of students taking a course by television was almost equal to the number enrolled in the on-campus class. For example, UT-Arlington shows an enrollment of 43 television students in EE 5313 in fall, 1985, while 48 took the same class on campus. (It may be that this course was offered in more than one section. The number of sections was not requested.) For the most part, however, high enrollments in the television classes were an anomaly. The average number of students in UT-Arlington's television classes in the fall semester, for example, was 11 with the actual numbers varying widely.

Low enrollments in television classes made grade distributions in percentages of little value when considered on a class-by-class basis. For example, percentage grade distributions for television students at

North Texas State University for fall, 1985, were meaningless because a total of only five students were enrolled. NTSU reported both the percentages and numbers to indicate the problem. For example, in a course in which 100% of the television students made A, it helped to know that there was only one.

The University of Houston-University Park, on the other hand, offered only two courses via InterAct in the fall semester with an average enrollment of 25.5. In both the fall and spring semesters, the total number of students enrolled at InterAct receive sites exceeded the number of on-campus students. On-campus enrollments totaled 42 and 80 in the respective semesters. Grade distributions were comparable in both semesters with one exception. In the fall, 20% of the television students in one class took "Incompletes" as opposed to 4.5% of the on-campus students in the same class. Since these were graduate level education classes, it is probable that many of the television students were employed as full time teachers and the "Incompletes" represent unfinished research papers. Attrition rates at UH-UP were very low and quite similar. In the fall, television students posted a 7% withdrawal rate as opposed to 5% for on-campus students. In the spring semester 9% of the television students withdrew and, again, 5% withdrew from the on-campus classes.

The University of Texas at Arlington had large total enrollments in both the televised and concurrent on-campus classes. Three hundred seventy-one students were enrolled in the 33 courses offered by television with 1,454 enrolled in the concurrent on-campuses classes in the fall semester. In the spring, Arlington offered 38 courses via televison to 356 students at receive sites and 1,099 on campus. In the

analysis of grade distributions, two courses were eliminated because some students had taken it on a pass/fail basis. All "Incompletes" also were omitted. Chart 9 shows grade distribution comparisons between students taking courses via television and those taking instruction on campus.

Chart 9

Grade Distributions in Percentages in Televised and Concurrent Courses at The University of Texas at Arlington, Fall and Spring Semesters

Semester	Mode of Delivery	A	B	C	D	F	W
Fall	Television	30	35	9	2	4	16
	On-Campus	24	26	18	7	6	17
Spring	Television	35	35	10	2	3	13
	On-Campus	22	28	23	8	6	12

These percentages were calculated from numerical enrollments supplied by the institution. If they differ from percentage calculations by the institution, such differences might be explained by the method of calculation or by error.

It might be noted that the percentage comparisons for UT-Arlington support Stanford's finding that television students tend to perform well with either interactive television or tutored video instruction. This finding might be explained by the fact that instruction is delivered to industry sites to working professionals. It might be speculated that such students possess more knowledge, have wider experience, and are more keenly motivated than traditional on-campus students.

Each institution supplied withdrawal policies and all differ. Withdrawal policies are less significant in analysis of data related to

interactive television since withdrawal rates tend to be low. The University of Houston-University Park allows withdrawals with a W through the 4th week of classes and WP's, which are recored as W's, through the 11th week. A failing student withdrawing after the 11th week receives a grade of F. North Texas State University permits withdrawals through the 13th week with grades of W or WF. UT-Arlington has a policy which permits withdrawal with a W through the 12th week if the student is passing. The institution does not award WP's or WF's. The institution's policy differs slightly for graduate students. Withdrawals are not permitted after midsemester except in unusual situations. Withdrawal policies apply equally to television and on-campus students at each of the three institutions.

Evaluation instruments were supplied by each institution. Systematic research on the effectiveness of televised instruction is not being conducted by any of the three universities at this time.

In summary, with two institutions only recently having begun offering instruction via interactive delivery systems, the best evidence of the effectiveness of this mode of providing instruction is available from The University of Texas at Arlington. The university has had many years of experience in televised instruction, and grade distributions, including attrition rates, are equivalent, with television students showing somewhat larger percentages of A's and B's. Arlington had student enrollments in more than 50% of the available receive sites. It might be anticipated that other universities choosing to offer instruction via live, interactive delivery systems will, with experience, enjoy similar success.

Conclusion

This report has had two primary objectives: 1) to review research and other materials related to the educational effectiveness of televised instruction, and 2) to provide information on activities of institutions authorized by the Board to use television during the 1985-86 academic year.

The literature examined strongly suggests that television is an effective mechanism for delivering instruction, but the crucial element in student achievement is the instruction itself. It is not the how but the what that is important. Research directions in recent years have turned from comparative studies between televised and on-campus classes to examination of the unique features of electronic media to determine how best to exploit them to improved education.

In every category except one, grade distributions are comparable at Texas community/junior colleges offering telecourses. Withdrawal percentages are higher in telecourses than in conventional classes, especially in large, urban areas. It has been suggested that high attrition is to be expected in open admission institutions and that the more meaningful comparison by policy makers should be be actual numbers of withdrawals from on-campus courses and equivalent telecourses.

Only one university offering live, interactive instruction via a microwave delivery system had sufficiently large enrollments in both televised and on-campus courses for meaningful percentage grade distribution comparisons. This university provided data that indicate grade distributions, including attrition rates, are comparable. Evidence from a second university also suggests that attrition rates are equivalent.

It is hoped that this report will allay concerns about the effectiveness of television as a mode of delivering instruction. The traditional classroom may be the ideal; however, if we continue to look to the past for our models, we will know where we have been, but we may not know where we are going.

APPENDIX A

Methodology

Two computer searches of the Education Resources Information Center's (ERIC) databases were conducted by the Texas State Library. The search strategies were evaluated by a knowledgeable, independent third party and pronounced "very good." The Perry-Castaneda Library of The University of Texas at Austin conducted a broader search of ERIC and related databases. Texas State Library also did a computer search of Dissertation Abstracts International.

References were obtained from Texas Education Agency and the Southwest Educational Development Laboratory from computer searches each had conducted for internal purposes. Each organization also supplied reference materials which they had published or had obtained for their own uses.

Telephone contacts were made to eighteen acknowledged leaders across the nation to solicit their views, additional references, and, particularly, unpublished materials. Many of the persons contacted sent letters, research reports or other publications which they thought would contribute to this study. A few local people were contacted personally.

All references obtained from the various computer searches were evaluated for their relevance to the specific project. Research reports were obtained from the Perry-Castaneda Library. All other materials supplied from the various sources mentioned above were read

and evaluated. Those bearing on the effectiveness of instruction offered via television are reported and referenced.

Many references which might have been included are omitted. The literature on this subject proved to be so extensive that it was not possible to review every available study; however, it is believed that the contents of this report present an accurate reflection of research findings.

To obtain the data reported in Part Two, the staff sent a survey instrument to all institutions authorized to offer instructional television requesting that they supply the following information: 1) total enrollments in televised courses and the equivalent on-campus courses, 2) grade distributions in percentages for both modes of instruction, 3) institutional withdrawal policies, and 4) copies of instruments used to evaluate televised instruction. These data were analyzed by the staff, using unsophisticated analytical techniques. Simple tabulations, percent derivations, and mean distribution calculations were employed.

APPENDIX B

Chronological Listing of Evaluation and Research Reports
Supplied by Dallas County Community College District

Grizzle, Grady. Government 201-TV. Unpublished report, Dallas County Community College District, Spring 1975.

Agler, Linda S. Telecourse students: summary and comparison statistics. Unpublished report, Dallas County Community College District, April 1976.

Agler, Linda S. Student perceptions of telecourses. Unpublished report, Dallas County Community College District, Spring 1976.

Agler, Linda S. Telecourse evaluation. Unpublished report, Dallas County Community College District, Summer 1976.

Telecourses in Dallas: The first three years. Unpublished report, Dallas County Community College District, August 1976.

Evaluation of English 101 telecourse, "Writing for a Reason." Unpublished report, Dallas County Community College District, October 1976.

The effect of course length on student performance. Unpublished report, Dallas County Community College District, 1977.

Comparison of telecourse and on-campus grade distributions from the fall semester, 1976. Unpublished report, Dallas County Community College District, March 1977.

Evaluation of the Business 105 telecourse, "It's Everybody's Business." Unpublished report, Dallas County Community College District, September 1977.

Comparison of telecourse and on-campus grade distributions from the spring semester, 1977. Unpublished report, Dallas County Community College District, September 1977.

Evaluation of the Psychology 105 telecourse, "As Man Behaves." Unpublished report, Dallas County Community College District, November 1977.

Psychology 201 evaluation. Unpublished report, Dallas County Community College District, Spring 1978.

Evaluation of the Humanities 101 telecourse, "In Our Own Image." Unpublished report, Dallas County Community College District, May 1978.

Comparison of telecourse and on-campus grade distributions from the fall semester of 1977. Unpublished report, Dallas County Community College District, May 1978.

History 101 telecourse evaluation fall 1977. Unpublished report, Dallas County Community College District, June 1978.

Comparison of telecourse and on-campus grade distributions from the spring semester of 1978. Unpublished report, Dallas County Community College District, September 1978.

Student perceptions of television courses at Dallas County Community College District. Unpublished report, Dallas County Community College District, September 1978.

The relationship of the Hill cognitive style instrument, age and sex to achievement in the Business 105 telecourse. Unpublished research report, Dallas County Community College District, Spring 1979.

Comparison of telecourse and on-campus grade distributions from the spring semester of 1979. Unpublished report, Dallas County Community College District, March 1979.

Student perceptions of television courses at Dallas County Community College District. Unpublished report, Dallas County Community College District, March 1979.

Information survey of telecourse students. Unpublished report, Dallas County Community College District, April 1979.

Telecourse marketing survey. Unpublished report, Dallas County Community College District, Fall 1979.

Comparison of telecourse and on-campus grade distributions from the spring semester of 1979. Unpublished report, Dallas County Community College District, September 1979.

Pohrte, Theodore W. Selected excerpts from research and evaluation studies on DCCCD telecourses. Unpublished report, Dallas County Community College District, November 1979.

A survey of student reactions to the video portion of "Writing for a Reason." Unpublished manuscript, Dallas County Community College District, Fall 1979.

Student evaluation of telecourses in the Dallas County Community College District. Unpublished report, Dallas County Community College, Spring 1980.

The relationship of the Hill cognitive style instrument and other variables to achievement in the Business 105 telecourse. Unpublished research report, Dallas County Community College District, April 1980.

The relationship between field dependence/independence and achievement in telecourses. Unpublished research report, Dallas County Community College District, April 1980.

Mount, George. Student evaluation for Psychology 105: Introduction to Psychology, "Understanding Human Behavior." Unpublished report, Dallas County Community College District, Fall 1981.

Mount, George. Student evaluation for Sociology 101: Principles of Sociology, "Focus on Society." Unpublished report, Dallas County Community College District, Fall 1981.

Rodgers, Samuel A. Comparison of student performance in ITV and on-campus sections of History 102: History of the United States from 1877 to the Present. Unpublished report, Dallas County Community College District, Fall 1981.

Rodgers, Samuel A. Comparison of student performance in ITV and on-campus sections of Sociology 101: "Introduction to Sociology." Unpublished report, Dallas County Community College District, Fall 1981.

Mount, George R. and Sharon R. Walters. Televised versus on-campus introductory psychology: a review and comparison. Unpublished report, Dallas County Community College District, Spring 1982.

Student evaluation "The Business of Management." Unpublished report, Dallas County Community College District, Spring 1983.

Student evaluation for CS 175-TV: Introduction to Computer Science, "The New Literacy." Unpublished report, Dallas County Community College District, Fall 1984.

Student evaluation for "Principles of Accounting" telecourse. Unpublished report, Dallas County Community College District, Fall 1985.

APPENDIX C

CRITERIA FOR PLAN APPROVAL

Criterion 1: The proposal falls within Coordinating Board authority (i.e., the institution is one over which the Coordinating Board has statutory authority; the planned televised instruction does not fall within an exempted area).

Criterion 2: The Plan has been approved by the institution's governing board.

Criterion 3: Policies designed to ensure quality equal to or greater than that of on-campus instruction are in place and appear effective.

Criterion 4: The delivery system chosen for use by the institution appears appropriate.

Criterion 5: Courses proposed to be included in the initial television course inventory appear appropriate to be offered via television.

Criterion 6: Courses proposed are all on the institution's official course inventory.

Criterion 7: Courses proposed support a campus-based degree or certificate program.

Criterion 8: The Plan stipulates the maximum proportion of the semester credit hour requirements of a degree/certificate program which can be taken via television and provides the required rationale if the proportion exceeds one-third.

Criterion 9: The Plan provides for at least the minimum faculty/student interaction specified in the rules and regulations (i.e., an orientation session, periodic scheduled sessions between the student and the instructor of record, and student access to the instructor as needed.)

Criterion 10: The Plan ensures that institutional policies apply equally to television students and to on-campus students.

Criterion 11: Provision has been made for support services to meet the unique needs of distance learners.

Criterion 12: Adequate provision has been made to ensure faculty involvement in the selection and adaptation of courses to be offered via television.

Criterion 13: Policies for the selection of faculty to offer televised instruction are in place and appear adequate.

Criterion 14: Provision for testing/feedback appear adequate.

Criterion 15: Policies for evaluation of faculty/courses are equivalent to those that apply to on-campus faculty and courses.

REFERENCES

Ackerman, Jerrold, and Lawrence Lipsitz. Instructional television: status and directions. Englewood Cliffs, N.J.: Educational Technology Publications, 1977.

Allen, Mary Lou. NT. Paper presented to ASEE, Rochester, N.Y., June 20, 1983.

Allen, Rex J., and Steven W. Allen. "Computer-assisted videodisc." Performance and Instruction Journal, November, 1983, pp. 28-30.

Allen, William H. "Instructional media research: past, present, and future." AV Communication Review, 19(1), Spring, 1971, pp. 5-18.

Anandam, Kamala, and J. Terence Kelly. "Evaluating the use of technology in education." Journal of Technology Systems, 10(1), 1981-82, pp. 231-31.

Barker, Bruce O. "Maintaining and/or expanding curricular offerings in small and rural high schools." Paper prepared for Technological-Based Curriculum Systems Teleconference, Dallas, Texas, October, 21-23, 1985.

Bates, A.W. "Educational and cost comparisons between open network, cable, and cassette systems of multi-media teaching." Paper presented at the Eighth Mediorama for the Development of Industry and Labor, Blankenberge, Belgium, May 16-18, 1973.

Bergin, Victoria. Personal letter, June 5, 1986.

Bell, Robert. Memorandum to Alex C. Sherriffs and John Bedell, February 7, 1983.

Berkman, Dave. "Instructional television: the medium whose future has passed." In Jerrold Ackerman and Lawrence Lipsitz (Eds.), Instructional television: status and directions. Englewood Cliffs, N.J.: Education Technology Publication, 1977.

Brey, Ron, and Charles Grigsby. Telecourse student survey, 1984: a project of the Instructional Telecommunications Consortium, American Association of Community and Junior Colleges. Unpublished monograph, 1984.

Burnette, Sharon. Personal letter, June 11, 1986.

Campus report. Stanford University, 15(28), April 13, 1983.

Carnegie Commission on Higher Education. Public trust: the report of the Carnegie Commission on Public Broadcasting. New York: Bantam Books, 1979.

Carnegie Commission on Higher Education. The fourth revolution: instructional technology in higher education. New York: McGraw-Hill, 1972.

Chu, Godwin, and Wilbur Schramm. Learning from television: what the research says. Washington: National Association of Broadcasters, 1967.

_____. Learning from television: what the research says. ERIC Document Reproduction Service No. ED109 985, 1975.

Clark, Richard E. "Reconsidering research on learning from media." Review of Educational Research, 53(4), Winter, 1983, pp. 445-449.

Craft, Elizabeth, and Norman Wagner. "Establishing an instructional television service." Paper presented at the annual meeting of the Association for Educational Communications and Technology, Anaheim, California, January, 1985.

Curtis, John A., and Alan Blatecky. "Project TIMES: telecommunications and medical educational services." Educational and Industrial Television, April, 1977, pp. 35-42.

Daniel, Lark O., and Charles J. McIntyre. The application of behavioral principles to the production and use of televised instruction. Unpublished manuscript, 1967.

Davis, Lori, and Russ Williams. Southwestern Baptist Theological Seminary and the production of instructional television courses. Master's thesis, Southwestern Baptist Theological Seminary, October, 1985.

Dirr, Peter J. Are television courses academically effective? Unpublished report, November, 1985.

_____. "Come home to college." Innovative Higher Education, 9(2), Spring/Summer, 1985, pp. 92-98.

Downing, Diane E. Survey on uses of distance learning in the U.S. Southwest Educational Development Laboratory, March, 1984.

Dubin, R., and R.A. Hedley. The medium may be related to the message: college instruction by TV. Eugene: University of Oregon Press, 1969.

Ellis, Lee, and Dan Mathis. "College students learning from televised versus conventional classroom lectures: a controlled experiment." Higher Education, 14(2), April, 1985, pp. 165-173.

ELRA Group, Inc. The adoption and utilization of Annenberg/CPB Project telecourses. Unpublished report, April 15, 1986.

Erickson, C.G., and H.M. Chausow. Chicago's TV college: final report of a three-year experiment. Chicago: Chicago City Junior College, 1960.

"Evaluation is stressed at Texas TI-IN network," Newsletter, Center for Interactive Programs, University of Wisconsin Extension, 8(12), December, 1985.

Gerbner, George. Annenberg School of Communication. University of Pennsylvania. Telephone interview, June 2, 1986.

Gibbons, James; Mary Lou Allen, and Judith Lemon. "Using video to improve productivity." Paper prepared for World Conference on Continuing Education, May 6, 1986.

Gibbons, J.F.; W.R. Kincheloe, and K.S. Downs. "Tutored videotape instruction: a new use of electronic media in education." Science, 195, March 18, 1977, pp. 1139-1146.

Goldberg, M., and J. Harvey. "A nation at risk: the report of the National Commission on Excellence in Education." Phi Delta Kappan, 65, September, 1984, pp. 14-18.

Fletcher, Geoffrey H. "Testimony for the Governors' Task Force on Advanced Technology in Education." Washington, D.C., January 10, 1986.

Heckman, Dale. Personal letter, June, 1986.

Hewitt, Louise M. (Ed.). A telecourse sourcebook. The Coast Community College, 1982.

Ho, Curtis P. "The interactive instructional television program: university courses for industry employees; implementation and evaluation of the ITFS pilot project." Paper presented at the annual meeting of the Association for Educational Communications and Technology, Dallas, Texas, January, 1984.

"Instructional uses of information technologies." WICHE Reports, 29(1&2), Spring/Summer, 1986.

Hobbs, Thomas W., Jr. The importance of certain background factors upon student persistence in college television courses. Doctoral dissertation, Nova University, June, 1976.

Holdampf, Barbara. "Innovative associate degree nursing program -- remote area: a comprehensive final report on an exemplary and innovative proposal." ERIC Document Reporduction Service ED 248 402, August, 1983.

Hough, Bruce R. "So you want to do teleconferencing?" E-ITV, November, 1982, pp. 55-56, 60.

Hudson, Heather, and Lynn York. Information and the economy: policy issues for educators. Southwest Educational Development Laboratory, June, 1983.

Hudspeth, DeLayne R., and Ron Brey. Instructional telecommunications: principles and applications. New York: Praeger, 1986.

Information Transfer Services. An Evaluation of DCCCD's "The Write Course." Unpublished report, Austin, Texas, June, 1985.

Instructional Design Services. Instructional Television: Application and Research. Arizona State University, January, 1983.

Instructional television: survey of student interests. Unpublished report, Los Angeles Community College, November, 1977.

Johassen, David H. "Learning from television: what are the limits?" Peabody Journal of Education, 58(4), July, 1981, pp. 242-250.

Julian, August A. "Utilizing telecommunications for non-traditional instruction in the North Carolina Community College System." ERIC Document Reproduction Service ED 224 957, July, 1982.

Karman, Patricia C. Report on the telecourse user survey to the Ohio Post-Secondary Telecommunications Council. Ohio State University, April, 1986.

Kelly, J. Terrence, and Kamala Anandam. "Nationwide prime-time television in higher education." International Journal of Instructional Media, 5(3), 1977-78, pp. 219-228.

Kruh, Jan. "Student evaluation of instructional teleconferencing." Teleconferencing and Electronic Media, Madison: University of Wisconsin, Extension, 1983, pp. 293-301.

Leveille, David E. Personal letter, June 5, 1986.

Levinson, Cynthia Y. The school problem-solver's guide to distance education." Southwest Educational Development Laboratory, November, 1984.

Linking Californians for learning: next steps for telecommunications in California postsecondary education. Report 81-28. Sacramento: California Postsecondary Education Commission, November, 1981.

Luskin, Bernard J. "Telecourses: 20 myths, 21 realities." Community and Junior College Journal, May, 1983, pp. 48-52, 60.

Maher, John H. Jr. "The interactive instructional television program: university courses for industry employees: rationale and planning." Paper presented to the Association for Educational Communications and Technology, Dallas, January, 1984.

Martin-Vegue, Charles A.; Albert J. Morris, and Gene E. Tallmadge. "University instructional television networks." Journal of Educational Technology Systems, 1(1), pp. 35-55, June, 1972.

Mayor, Mara. Personal letter, June 5, 1986.

McBride, Jack. "The twenty elements of instructional television: a summary." Paper presented at the Seminar on Educational Television, Center for Educational Television Overseas, Cairo, Egypt, February 6-12, 1966.

Meuter, Ralph F. Personal letter, June 4, 1986.

Michael, William B., and Lisa Knapp-Lee. Evaluating learning in telecourses. Fountain Valley, California: Coastline Community College, September, 1985.

Morris, Albert J.; Kenneth S. Downs, Jack Munushian, L. Farrell McGhie, Robert Rubenstein, and Robert C. Hike. Final report on cost effectiveness of continuing engineering studies in television. Report to the Continuing Engineering Studies Division of the American Society of Engineering Education, May, 1974.

Muzzin, Linda J. "Technology in higher education; does it really improve accessibility and quality and cost less in the long run?" ERIC Document Reproduction Service ED 207 428, March 1981.

Naylor, Michele. "Distance education." ERIC CLearinghouse on Adult, Career, and Vocational Education, 1984.

O'Rourke, James. The introduction of videotaped instructional material into the curriculum of the United States Air Force Air Command and Staff College Associate Seminar program: a comparison of educational strategies. Doctoral dissertation, Syracuse University, March, 1980.

Passow, A. Harry. Reforming schools in the 1980's: a critical review of the national reports. New York, ERIC CLearinghouse on urban education, 1984.

Pease, Pamela, "The evaluation of the TI-IN Network's satellite based educational network: the innovators (high school administrators) and the users (high school students): a preliminary report." June 3, 1986.

Perelman, Lewis J. "'Learning enterprise' in, school out for future students." Dallas Morning News, May 25, 1986.

Perrin, D.G. "Synopsis of television in education." In Jerrold Ackerman and Lawrence Lipsitz (Eds.), Instructional television: status and directions. Englewood Cliffs, N.J.: Educational Technology Publications, 1977.

Pflieger, E.G., and F.C. Kelly. The National Program in the Use of Television in the Public Schools. New York: The Ford Foundation and the Fund for the Advancement of Education, 1961.

Pettit, Joseph M., and Donald J. Grace. "The Stanford instructional television network." IEEE Spectrum, May, 1970, pp. 73-80.

Phipps, Ron. Personal letter, November 22, 1985.

Pohrte, Theodore W. A summary of the instructional television seminar, Dallas, Texas, July 10-11, 1978. Unpublished report, February, 1979.

Proceedings: seminar on research and evaluation in instructional telecommunications. Center for Telecommunications, Dallas County Community College District, February 14-15, 1980.

Purdy, Leslie N. "The history of television and radio in continuing education." In Leslie N. Purdy (Ed.), Reaching new students through new technologies. Dubuque: Kendall/Hunt, 1983.

Reid, J.C., and D.W. MacLennan. Research in instructional telvision and film: summary of studies. University of Missouri: U.S. Department of Health, Education, and Welfare Report No. OE-34041, n.d.

Research Communications, Ltd. Research on student uses of the Annenberg/CPB telecourses for the fall of 1984. Unpublished report, February, 1985.

Rollyson, C.E. "Quality in alternative delivery systems: television: the weekend college model," North Central Association Quarterly, 59(1), Summer, 1984, pp. 9-13.

Roos, David E., et al. Educational television in New York State; program audit 3.1.73. Albany, N.Y.: State Legislative Commission on Expenditure Review, July, 1973.

Roth, Edith Brill. "Two-way TV trains teachers." American Education, 16(9), November, 1980, pp. 20-28.

Sales, Michael. A comparison between television and the classroom for learning effectiveness: a review of literature in instructional television. Consortium of the California State University and Colleges, August, 1976, pp. 1-32.

Salomon, Gavriel, and Richard Clark. "Reexamining the methodology of research on media and technology in education." Review of Educational Research, 47(1), Winter, 1977, pp. 99-120.

Sceiford, Mary. "Television for learning: future research opportunities. Educational Communication and Technology, 26(1), Spring, 1978, pp. 55-63.

Schramm, Wilbur. "Learning from instructional television." Review of Educational Research, 32, 1962, pp. 156-167.

_____. Big media, little media: tools and technologies for instruction. Beverly Hills: Sage, 1977.

_____. Big media, little media: a report to the Agency for International Development. ERIC Document Reproduction Service ED 077 186, p. 190, n.d.

SEDL's technology quick reference. Southwestern Educational Development Laboratory, n.d.

Sharpe, Mal. Anik-B interactive television project, October 1, 1979 - May 31, 1980. ERIC Document Reproduction Service ED 200 767, October, 1980.

Smith, Jeanne. Evaluation of the telecourse program at Saddleback college: student retention and academic achievement. Doctoral dissertation, Nova University, 1983.

Steinke, Ralph G., and Danniel J. Griffin. "Doing 'distance learning'? Do student surveys, too." E-ITV, November, 1982, pp. 44, 48-49.

Stickell, D.D. A critical review of the methodology and results of research comparing televised and face-to-face instruction. Doctoral dissertation, Pennsylvania State University, 1963.

Souzzi, Paul Joseph. The effects of dissonance reducing messages on metropolitan telecourse students' persistence in writing scheduled exams. Doctoral dissertation, University of New Mexico, July, 1984.

Tate, Pamela J., and Marilyn Kressel. "Concluding comments and further resources." In Tate and Kressel (Eds.), The Expanding Role of Telecommunications in Higher Education. San Francisco: Jossey-Bass, 1983, pp. 93-109.

The Complete Issue Papers of the Governor's Commission on the Future of Higher Education in Michigan. Lansing, Michigan, December 13, 1984. ERIC document Reproduction Service, No. ED 252 126.

The first six years: instructional television Dallas. Dallas County Community College District, May, 1978.

Topper, Martin D.; William L. Singleton, Anne Attebury, Donna B. Birdwell, and Debra Schumann. Telecourses: the 'open university' in Dallas. Southern Methodist University, September, 1975.

Using instructional media beyond campus: one of a series of reports on lifelong learning. Sacramento: California Postsecondary Education Commission, 1979.

Wade, Serena. "Hagerstown: a pioneer in closed-circuit televised instruction." In New educational media in action: case studies for planners - I. Paris: UNESCO International Institute for Educational Planning, 1967, pp. 193-208.

Wagner, Norman. 1985 ITFS Evaluation Report. Arizona State University, 1985.

"The interactive instructional television program: university courses for industry employees, evaluation procedures and results." Paper presented to the Association for Educational Communications and Technology, Dallas, January, 1984.

Wilkinson, Gene. "Excellence through education technology: some prior considerations." ERIC Clearinghouse on Information Resources, 1984.

Wiesner, Peter. "Some observations on telecourse research and practice." Adult Education Quarterly, 33(4), Summer, 1983, pp. 215-221.

Williams, Frederick, and Monty C. Stanford. "ITV/ETV evaluation: what we should expect." In Jerrold Ackerman and Lawrence Lipsitz, Instructional television: status and directions. Englewood Cliffs, N.J.: Educational Technology Publications, 1977, pp. 85-94.

Wood, D.N. and D.G. Wylie. Educational Telecommunications. Belmont, California: Wadsworth, 1977.